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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/519,255

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Takehiko Kikuchi

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03/18/2008

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EXAMINER

YEE, DEBORAH

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/519,255	Applicant(s) KIKUCHI ET AL.	
	Examiner Deborah Yee	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3 to 7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3 to 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 8, 2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 3 to 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,198,041 (Takemoto et al.).

4. Takemoto et al. in claim 4 of columns 11-12 discloses an analogous Fe-Mn-Si –based shape memory alloy that is thermo-mechanically treated in substantially the same manner as claimed by Applicants. Note the prior art stainless steel alloy has a composition with constituents whose wt% ranges overlaps those recited by the claims; hence a prima facie case of obviousness has been established. In addition, prior art steel is processed by first forming alloy into an article of predetermined shape followed by subjecting article to a training cycle that can be performed just once by deforming at an unspecified deformation ratio with a temperature not higher than room temperature (suggest claimed deformation step at room temperature with a deformation

ratio of from 10 to 20%) followed by heating to a temperature from 450 to 700 °C (equivalent to claimed aging treatment at 400 to 1000 °C).

5. More specifically, Takemoto et al. in table 1 of columns 9-10 discloses shape memory alloy examples that closely meet the claimed composition. Note for instance, A15 meets the claimed composition except for 0.009%C and has an atomic ratio Nb/C=4.44 (within claimed range of ≥ 1). Although its C content of 0.009% is slightly outside Applicants' C range of 0.01 to 0.2%, it would be obvious for one skilled in the art to raise C content since prior art teaches a broad C range of up to 0.10%. Moreover Applicants have not demonstrated (e.g. by comparative test data) that the claimed C range of 0.01 to 0.2% is somehow critical and productive of new and unexpected results.

6. Another prior art example, A16, in table 1 of columns 9-10 meets the claimed composition except has an atomic ratio Nb/C=0.88, which closely approximates Applicants' lower Nb/C limit range of 1.0. Since Applicants have not demonstrated criticality of the Nb/C atomic ratio ≥ 1.0 to be critical (e.g. by comparative test data), then it would seem that a composition with an atomic ratio of 1 verses a composition with slightly less than 1 (say 0.88) would depict a mere difference in the proportion of element without any attendant unexpected results, which would not patentably distinguish claims over prior art.

7. In addition alloys, A15 and A16, are also processed in substantially the same manner as recited by the claims. Note lines 19-21 of column 7 teach first forming alloy into an article of predetermined shape comprising the steps of casting, forging and hot rolling to a thickness of 3 mm and annealing; and then subjecting article to one training cycle comprising the step of cold rolling (equivalent to deformation at room temperature) to a thickness of 2 mm such that the

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calculated deformation ratio is 33.3%; and then annealing after cold rolling at a temperature between 450 and 700C as taught in prior art claim 4 (equivalent to Applicants' aging temperature of 400 to 1000C).

8. Even though prior art examples teach 33.3% deformation ratio whereas claims of present invention recite 10 to 20%, such would not be a patentable distinction. Note that claim 4 of Takemoto et al. teaches a training cycle comprising deformation at a temperature of not higher than room temperature with unspecified deformation ratio to achieve shape memory property, which would, in general, encompass a deformation ratio of from 10 to 20 % as recited by claim 1.

9. Moreover, since Applicants have not demonstrated (e.g. by comparative test data) that the more narrowly claimed deformation ratio of 10 to 20% is somehow critical or productive of new and unexpected results, then claims would not patentably distinguish over prior art. Note Applicants' test data in figure 2 does not demonstrate 10 to 20% deformation ratio as critical since figure 2 shows that remarkable increase in shape recovery stress, which is one of the important shape memory properties for practical use, is observed in cases of high rolling ratios of 20% or 30%, and prior art examples teach a deformation ratio of 33% (closely approximates 30%).

Response to Arguments

10. Applicant's arguments filed December 26, 2007 have been fully considered but they are not persuasive.

11. It was submitted that Takemoto et al. does not teach or suggest deforming Fe-Mn-Si-based shape memory alloy by a deformation ratio of 10 to 20% at room temperature because the

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method of Takemoto et al., column 7, line 49 to column 8, line 10, deforms test pieces at 4% or 6%. It is the Examiner's position that the prior art test pieces are deformed by 4% or 6% tensile strain, and tensile strain is different from deformation ratio. Moreover, such deformation step is not the training cycle step to achieve and memorize a primary shape as recited by Applicants' present invention claims but rather the final step of deforming the primary shape memorized article to a desired secondary shape at a temperature of not higher than room temperature, heating it to a temperature of at least 100C and allowing it to cool to room temperature, thereby to recover the primary shape.

12. Moreover, the example referred to by Applicants on lines 40 in column 7 to column 8, line 10 teaches a training cycle comprising the step of subjecting an annealed hot rolled sheet having a thickness of 3 mm to repeated cold rolling (deformation at room temperature) to a thickness of 1 mm with a calculated deformation ratio of 66% followed by annealing (aging). This example does not teach Applicants' present invention since a deformation ratio of 66% is outside claimed deformation ratio of 10 to 20% .

13. Takemoto et al., however, teaches another example in column 7, lines 10 to 40 wherein annealed hot rolled steel sheet having a thickness of 3 mm is subjected to a one-step training cycle of cold rolling to a thickness of 2 mm with a calculated deformation ratio of 33%, which closely approximates the claimed deformation ratio of 10 to 20%. Since Applicants has not demonstrated (e.g. by comparative test data) that the more narrowly claimed deformation ratio of 10 to 20% is somehow critical or productive of new and unexpected results, then claims would not patentably distinguish over prior art. Note Applicants test data in figure 2 does not demonstrate criticality of 10 to 20% deformation ratio since figure 2 shows that remarkable

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increase in shape recovery stress, which is one of the important shape memory properties for practical use, is observed in cases of high rolling ratios of 20% or 30%, and prior art examples teach a deformation ratio of 33% (closely approximates 30%). Moreover, Applicants' specification on lines 9 to 16 of page 8 teaches 5 to 40% rolling ratio as permissible to achieve shape memory property.

14. For the reasons stated above, claims would not patentably distinguish over

Takemoto et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah Yee whose telephone number is 571-272-1253. The examiner can normally be reached on monday-friday 6:00 am-2:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Deborah Yee/
Primary Examiner
Art Unit 1793

/DY/